

In the Claims

This listing of claims will replace all prior versions and listings of claims in the application:

- 1 1. (Currently Amended) A Booth encoding circuit comprising:
  - 2 a plurality of cells, wherein at least one of said cells
  - 3 comprises:
    - 4 a plurality of inputs;
    - 5 a first plurality of transistors forming a ~~first~~ NAND logic
    - 6 stage, wherein at least one of said inputs is connected to at
    - 7 least one of said first plurality of transistors;
    - 8 a second plurality of transistors forming a ~~second~~ an OR
    - 9 logic stage, wherein at least one of said inputs is connected to
    - 10 at least one of said second plurality of transistors;
    - 11 a first output inverter connected to at least one of said
    - 12 second plurality of transistors;
    - 13 a first switching means connected to at least one of said
    - 14 first plurality of transistors;
    - 15 a second switching means connected to said first output
    - 16 inverter;
    - 17 a second output inverter connected to said first switching
    - 18 means and said second switching means, wherein within a critical
    - 19 path of said Booth encoding circuit said first output inverter
    - 20 drives said second output inverter.
- 1 2. (Original) The Booth encoding circuit of claim 1, wherein
- 2 within said critical path of said Booth encoding circuit said
- 3 first output inverter drives said second output inverter via said
- 4 second switching means.
- 1 3. (Original) The Booth encoding circuit of claim 2, wherein
- 2 said first switching means comprises a first transfer gate switch

3 and said second switching means comprise a second transfer gate  
4 switch.

4. (Canceled)

1 5. (Currently Amended) The Booth encoding circuit of claim 4 1,  
2 wherein said critical path comprises at least two of said second  
3 transistors, said first output inverter, said second switching  
4 means, and said second output inverter.

1 6. (Original) The Booth encoding circuit of claim 5, wherein a  
2 critical path transistor level within said cell is less than six  
3 and a critical path transistor level within said Booth encoding  
4 circuit is less than ten.

1 7. (Currently Amended) The Booth encoding circuit of claim 4 1,  
2 wherein an output of said second output inverter is logically  
3 expressed by the formula  $Y_{2n+1} * (Y_{2n} * Y_{2n-1}) + Y_{2n+1} * (Y_{2n} + Y_{2n-1})$ ,  
4 wherein said plurality of inputs comprise  $Y_{2n}$ ,  $Y_{2n-1}$ , and  $Y_{2n+1}$ .

1 8. (Original) The Booth encoder of claim 2, wherein said cell  
2 further comprises an input inverter connected to said first  
3 switching means and at least one of said inputs.

1 9. (Original) The Booth encoder of claim 8, wherein at least  
2 one of said inputs is connected to said second switching means.

1 10. (Currently Amended) A multiplier comprising:  
2       A Booth encoding circuit, wherein said Booth encoding  
3 circuit comprises a plurality of cells, wherein at least one of  
4 said cells comprises:  
5       a plurality of inputs;

6        a first plurality of transistors forming a ~~first~~ NAND logic  
7 stage, wherein at least one of said inputs is connected to at  
8 least one of said first plurality of transistors;  
9        a second plurality of transistors forming a ~~second~~ an OR  
10 logic stage, wherein at least one of said inputs is connected to  
11 at least one of said second plurality of transistors;  
12       a first output inverter connected to at least one of said  
13 second plurality of transistors;  
14       a first switching means connected to at least one of said  
15 first plurality of transistors;  
16       a second switching means connected to said first output  
17 inverter;  
18       a second output inverter connected to said first switching  
19 means and said second switching means, wherein within a critical  
20 path of said Booth encoding circuit said first output inverter  
21 drives said second output inverter.

1 11. (Original) The multiplier of claim 10, wherein within said  
2 critical path of said Booth encoding circuit said first output  
3 inverter drives said second output inverter via said second  
4 switching means.

1 12. (Original) The multiplier of claim 11, wherein said first  
2 switching means comprises a first transfer gate switch and said  
3 second switching means comprise a second transfer gate switch.

13. (Canceled)

1 14. (Currently Amended) The multiplier of claim ~~13~~ 10, wherein  
2 said critical path comprises at least two of said second  
3 transistors, said first output inverter, said second switching  
4 means, and said second output inverter.

1 15. (Original) The multiplier of claim 14, wherein a critical  
2 path transistor level within said cell is less than six and a  
3 critical path transistor level within said Booth encoding circuit  
4 is less than ten.

1 16. (Currently Amended) The multiplier of claim ~~13~~ 10, wherein  
2 an output of said second output inverter is logically expressed  
3 by the formula  $Y_{2n+1} * (Y_{2n} * Y_{2n-1}) + Y_{2n+1} * (Y_{2n} + Y_{2n-1})$ , wherein  
4 said plurality of inputs comprise  $Y_{2n}$ ,  $Y_{2n-1}$ , and  $Y_{2n+1}$ .

1 17. (Original) The Booth encoder of claim 11, wherein said cell  
2 further comprises an input inverter connected to said first  
3 switching means and at least one of said inputs.

1 18. (Original) The Booth encoder of claim 17, wherein at least  
2 one of said inputs is connected to said second switching means.

1 19. (Currently Amended) A multiply-accumulate module comprising:  
2 a multiplier, wherein said multiplier comprises:  
3       A Booth encoding circuit, wherein said Booth encoding  
4 circuit comprises a plurality of cells, wherein at least one of  
5 said cells comprises:  
6       a plurality of inputs;  
7       a first plurality of transistors forming a ~~first~~ NAND logic  
8 stage, wherein at least one of said inputs is connected to at  
9 least one of said first plurality of transistors;  
10      a second plurality of transistors forming a ~~second~~ an OR  
11 logic stage, wherein at least one of said inputs is connected to  
12 at least one of said second plurality of transistors;  
13      a first output inverter connected to at least one of said  
14 second plurality of transistors;

15        a first switching means connected to at least one of said  
16    first plurality of transistors;  
17        a second switching means connected to said first output  
18    inverter;  
19        a second output inverter connected to said first switching  
20    means and said second switching means, wherein within a critical  
21    path of said Booth encoding circuit said first output inverter  
22   drives said second output inverter.

1    20. (Original) The multiply-accumulate module of claim 19,  
2    wherein a critical path transistor level within said cell is less  
3    than six and a critical path transistor level within said Booth  
4    encoding circuit is less than ten.